

## **Investigation of the antiferromagnetic ground state of $\text{Ce}(\text{Fe}_{1-x}\text{Co}_x)_2$**

L. Paolasini <sup>1</sup>, B. Ouladdiaf <sup>2</sup>, G. H. Lander <sup>3</sup>, N. Bernhoeft <sup>4</sup>, P. Canfield <sup>5</sup>

<sup>1</sup> *European Synchrotron Radiation Facility, B.P. 220, F-38043 Grenoble, France*

<sup>2</sup> *Institut Laue Langevin, B.P. 156, 38042 Grenoble, France*

<sup>3</sup> *EITU, JRC, Postfach 2340, D-76125 Karlsruhe, Germany*

<sup>4</sup> *DRFMC, CEA-Grenoble, 38054 Grenoble, France*

<sup>5</sup> *Ames Laboratory and Iowa State University, Ames, Iowa 50011, USA*

Resonant X-ray magnetic scattering experiment have been performed on a single crystal of  $\text{Ce}(\text{Fe}_{1-x}\text{Co}_x)_2$  ( $x=0.07$ ). With small doping the AF state is stabilized at low temperature, together with a large rhombohedral distortion. We show by the azimuthal dependence of the scattered X-ray intensity at the  $L_3$  edge of Ce that the Ce moments appear to lie parallel to the rhombohedral axis of distortion of the single domain probed. This result would be in disagreement with the accepted simple collinear spin arrangement from neutron-diffraction experiments [1]. As a result, we re-analyze the neutron data to show that a possible model consistent with both experimental results involves a non-collinear arrangement of Fe spins. Introducing the dynamical aspect of this concept into the physics of  $\text{CeFe}_2$  may allows us to understand how the frustration of the Fe tetrahedra lead to the appearance of AF fluctuations in the presence of ferromagnetism [2]. A theoretical point of interest is the microscopic mechanism that stabilizes this AF state for so many different dopant ions [3,4]. [1] S.J. Kennedy *et al*, J. Phys. CM 1, 629 (1989); [2] L. Paolasini *et al*, Phys. Rev. B58, 12117 (1998); [3] H. Fukuda *et al*, Phys. Rev. B63, 054405 (2001); [4] P.K. Khowash, Phys. Rev. B43, 6170 (1991).